

Applicant : Paul Frederick Koeppel et al.
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Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

RPR

Listing of Claims

power

1. (Previously presented) A voltage recovery device for connection to a utility_A network including a transmission network for carrying a nominal voltage within a first predetermined voltage range; a distribution network, electrically connected to the transmission network, for carrying voltages within a second predetermined voltage range, lower than the first predetermined voltage range, the distribution network having distribution lines coupled to at least one load, the voltage recovery device comprising an inverter electrically coupled in shunt to the distribution network and configured to transfer, in response to a fault condition detected on the utility power network, reactive power between the distribution network and voltage recovery device at a level and for a duration sufficient to recover the voltage on the utility power network to within a predetermined proportion of the nominal voltage.

2. (Previously presented) The voltage recovery device of claim 1 further comprising a controller connected to the inverter and configured to control the amount reactive power transferred between the inverter and a utility power network.

3. (Original) The voltage recovery device of claim 2 further comprising an energy storage interface connected to the inverter.

4. (Original) The voltage recovery device of claim 3 further comprising an energy storage unit connected to the energy storage interface.

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5. (Original) The voltage recovery device of claim 4 wherein the energy storage unit is selected from a group consisting of a flywheel storage unit, a battery, a compressed gas energy storage unit, a capacitive energy storage unit and a fuel cell energy storage unit.

6. (Previously presented) A method of stabilizing a utility power network including a utility power network having a transmission network for carrying a nominal voltage within a first predetermined voltage range and a distribution network, electrically connected to the transmission network, for carrying voltages within a second predetermined voltage range, lower than the first predetermined voltage range, the distribution network having distribution lines couples to at least one load, the method comprising:

electrically connecting a first voltage recovery device in shunt to the distribution network,

detecting a fault condition on the utility power network; and

operating, in response to detecting the fault condition, the first voltage recovery device to transfer reactive power to the utility power network at a level and for a duration to recover the voltage on the utility power network to within a predetermined proportion of the nominal voltage.

7. (Original) The method of claim 6 further comprising electrically coupling an inverter to the utility power network, wherein operating the voltage recovery device includes controlling the inverter to control the level of reactive power transferred to the utility power network.

8. (Original) The method of claim 6 further comprising:

electrically coupling a second voltage recovery device to the utility power network; and

operating, in response to detecting the fault condition, the second voltage recovery device to transfer real power to the utility power network.

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9. (Original) The method of claim 8 wherein the second voltage recovery device is electrically coupled to the distribution network.

10. (Original) The method of claim 8 wherein the second voltage recovery device is electrically coupled to the utility power network at a location remote from the first voltage recovery device.

11. (Original) The method of claim 8 comprising connecting a plurality of second voltage recovery devices to the utility power network.

12. (Previously amended) A control system for controlling a voltage recovery device, the voltage recovery device electrically coupled to a utility power network including a transmission network for carrying a nominal voltage within a first predetermined voltage range; a distribution network, electrically connected to the transmission network, for carrying voltages within a second predetermined voltage range, lower than the first predetermined voltage range, the control system comprising:

a memory including at least a portion for storing a computer program for controlling the voltage recovery device electrically coupled to the distribution network, the stored program including computer-readable instructions which, in response to an indication of a detected fault, provides control signals to the voltage recovery device to control the transfer of reactive power to the distribution network at a level and for a duration to recover the voltage on the transmission network to within a predetermined proportion of the nominal voltage;

a processor to execute the computer-readable instructions; and
a bus connecting the memory to the processor.

13. (Previously presented) A method of stabilizing a utility power network including a utility power network having a transmission network for carrying a nominal voltage within a

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first predetermined voltage range and a distribution network, electrically connected to the transmission network, for carrying voltages within a second predetermined voltage range, lower than the first predetermined voltage range, the method comprising:

electrically connecting a plurality of voltage recovery devices to the distribution network,
detecting a fault condition on the utility power network; and

operating, in response to detecting the fault condition, one or more of the voltage recovery devices to transfer reactive power to the utility power network at a level and for a duration to recover the voltage on the utility power network to within a predetermined proportion of a nominal voltage.

14. (Previously presented) A utility power network comprising a transmission network for carrying a nominal voltage within a first predetermined voltage range;

a plurality of distribution networks, each electrically connected to the transmission network, for carrying voltages within a second predetermined voltage range, lower than the first predetermined voltage range, each of the distribution networks coupled to at least one load, and

a plurality of voltage recovery devices connected to at least one of the distribution networks, each of the voltage recovery devices configured to provide reactive power to the at least one of the distribution networks at a level and for a duration to recover the voltage on the transmission network to within a predetermined proportion of the nominal voltage, following a fault condition detected on the utility power network.

15. (Previously presented) The method of claim 13 wherein the plurality of voltage recovery devices are configured to provide real power.

16. (Previously presented) The utility power network of claim 14 wherein the plurality of voltage recovery devices are configured to provide real power.

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17. (Previously presented) The method of claim 13 wherein operating one or more of the voltage recovery devices such that the transfer of reactive power to the utility power network in aggregate is at a level and for a duration to recover the voltage on the transmission network to within a predetermined proportion of a nominal voltage.

18. (Previously presented) The method of claim 13 further comprising electrically connecting each of the plural voltage recovery devices at line segments of the transmission network having a fault which causes the voltage on the line segment to be less than 90% of the nominal voltage.

Please cancel claim 19.

20. (Previously presented) The utility power network of claim 14 wherein each of the voltage recovery devices is configured to transfer reactive power to the utility power network in aggregate is at a level and for a duration to recover the voltage on the transmission network to within a predetermined proportion of a nominal voltage.

21. (Previously presented) The method of claim 14 further comprising electrically connecting each of the plural voltage recovery devices at line segments of the transmission network having a fault which causes the voltage on the line segment to be less than 90% of the nominal voltage.

Please cancel claim 22.